

From: Tami Thatcher
Sent: Thursday, June 09, 2016 8:07 PM
To: NIOSH OCAS (CDC); NIOSH Docket Office (CDC)
Subject: Separating fact from fiction on SL-1 responders at INL

Dear NIOSH and board:

The Radiation Dose to SL-1 Responders at the Idaho National Laboratory (and more)

Official accounts of the response to the fire alarm that sounded following the explosion at the SL-1 reactor rarely discuss the problems, uncertainties, and mistakes of the emergency responders. While the responders performed bravely, early responders were largely ignorant of the level of hazard they were entering and this was a fact that the AEC avoided admitting. These early responders also did not realize there was a man fatally injured but still alive, on the reactor main floor.

There had been two false alarms responded to by the fire department the day of the accident. It was naturally assumed that this third fire alarm might be a false alarm. So when the first fire truck arrived at the locked gate at SL-1, there appeared to be no fire, only steam drifting from the building, which appeared normal.

The fireman, including [redacted] waited for security to come and unlock the gate because there was no response from the crew at the SL-1. They thought the steam rising from the building was normal and they were unaware that they were in the plume of the SL-1 release. The firemen proceeded directly to the location of the previous false alarms but found them in working order. The ringing alarms could not be distinguished—fire alarms and radiation alarms sounded alike. Radiation alarms were common occurrences as they were often set to detect very low levels of contamination.

It was only after entering the building and finding no reason for the fire alarms and then finding an empty control room with lighted radiation alarms that the firemen returned to the fire truck to get radiation detectors. When they noticed the radiation detector pegging on their first stair ascent to the SL-1 reactor main floor, they suspected it was malfunctioning and got another. When the second detector pegged, they knew they had a radiation problem but they still did not know where the three-man crew was or what had happened.

[redacted] and [redacted] later account would not admit that these firemen entered the facility not knowing a reactor accident had occurred and not knowing the radiation hazards they faced. Because of the tendency for the AEC to avoid unpleasant facts, NIOSH needs to recognize the incentives the AEC had to making fictional accounts and in understating radiation doses.

There were numerous trips into the building and up the stairs to the reactor operating area and by numerous emergency responders. And the radiation fields were far in excess of 25 rem/hour and in an unknown level of excess beyond 500 rem/hr in some areas. The higher range radiation detectors were pegging at 500 R/hr, and responders understood that they must limit their time in such high radiation fields to seconds or minutes. And while responders wore Scott Air-pacs inside the building, they were inhaling the contamination that was escaping from the exhaust fan and other openings to the operating room area.

Visibility issues inside the building were largely due to fogging of face-masks in the steamed environment of the SL-1, combined with the 17 below zero temperatures of that January night. Lighting in the building remained, with only some of the lights damaged in the reactor operating area.

The first fatally injured crewman was discovered to still be alive after he was heard moaning. Entry was then planned and made to the reactor operating area to carry him outside the building. He was administered artificial respiration in an ambulance. The man's face was nearly removed, but the attempt was made to save him. The nurse in the ambulance with the victim was not wearing a radiation badge, but the injured man was measured at 5 rem per hour later prior to autopsy and the empty ambulance was later surveyed and found to be highly contaminated: 20 rem per hour on the rear bumper and 10 rem per hour on the floor inside the back of the ambulance.

Eleven emergency responders were found to have radiation levels exceeding 10 rem per hour on their extremities. They disrobed outside the neighboring facility one mile away, the Gas Cooled Reactor Experiment (GCRE) plant and were decontaminated and showered—in this facility whose radiation detectors had alarmed earlier due to airborne emissions from the SL-1 accident. [redacted] did not forget the experience of undressing outside in subzero weather in order to have a shower.

The fire engines returned to the fire station were later found to be contaminated. Attempts to vacuum the contamination resulted in further spread of contamination in the fire station. AEC monthly reports would later document that portions of the highway to Arco and the site that had been initially declared to be unaffected by SL-1 fallout were later found contaminated and hosed off. And months later the contaminated soil at the side of the road where it had been hosed off would be exhumed for burial elsewhere. Concern about alpha contamination was non-existent.

The extent of contamination on the three victims would require their burial in lead-lined caskets, as well as the amputation of body parts too hot to be adequately shielded by the special built lead-lined caskets. Attempts to decontaminate the deceased men were largely ineffective as their skin had absorbed the radionuclides from the steam explosion and neither soaking nor scrubbing would remove the contamination. The men's bodies were autopsied at ICPP.

There was awareness of the need to protect responders and later cleanup workers from unsafe radiation fields. But the measures taken did not necessarily translate into effective monitoring or protection during the emergency response or during the subsequent cleanup. Instrument adequacy in highly variable radiation fields was deemed to be acceptable—close enough for government work—as a tiny badge is assumed to adequately reflect exposure. And the history of the responders movements and the doses received would be rewritten or deliberately lost on more than one occasion.

Various conflicting accounts describe the first responders movements and stay times at the SL-1: AEC report IDO-19302, William McKeown's "Idaho Falls: The Untold Story," and [redacted] and [redacted] presentation to the Health Physics Society meeting.

[redacted], a fireman responding to the SL-1 accident that night, was told a few days that he had received 18 rem. Years later, when he was transferring to a different contractor, he was asked for his radiation dose history, which he sought to obtain. After requesting his records, he was told that his records could not be found. Neither could those of the fireman who had accompanied him. His later requests to obtain the missing records were met with resistance—and no acknowledgment of the irregularity.

The gate where the firemen waited for it to be unlocked is about 200 ft south of the reactor, and winds that night blew from north to south, as plume dispersion diagrams show. There was no monitoring beyond their badges at this time and later radiation maps may understate the shine they got from the inversion conditions and the plume.

There are multiple stair ascents by various people, including "Assistant Fire Chief" and "Fire Captain" that are acknowledged in IDO-19302 — but no fireman is listed as receiving more than 5 rem that night according to and presentation which gives a less than factual account of the response in order to avoid admitting that early responders did not know the radiation fields they were entering. The report's subsequent radiation doses given that should be take with a grain of salt. . .and perhaps a pinch of cesium-137.

Atomic Energy Commission report, IDO-19302 gives a more complete account of the responders movements but still avoids giving a complete description of all of the people who ascended the stairs and all of the ascents. There is no discussion that they assumed their radiation detector, with such high readings was malfunctioning and so they obtained from the fire engine another detector was then used for a second ascent up the stairs. It is important to understand that there were multiple fireman and others who ascended the stairs to the reactor main floor. And because those early investigations to survey the reactor main floor had failed to discover that one of the crewman was still alive, there was reluctance to acknowledge the high radiation doses received in those early movements of the first responders.

It is important for NIOSH to understand that the responders the AEC acknowledged as receiving over 5 rem in responding to the SL-1 accident was incomplete. No firemen were identified as receiving over 5 rem – and for at least two of the firemen, their entire radiation dose history disappeared. The radiation doses that are acknowledged appear to be underestimated as well. So here you have the volatile gases and fission products released from the open ventilation system of the SL-1 reactor building and no water for shielding the irradiated fuel and fuel debris remaining in the reactor vessel because 1200 gallons of water has vaporized and with it, fission products melting a significant portion of the fuel which had 932 MWd of accumulated fission products.

If ever there needed to be a special exposure cohort, it would be for all SL-1 responders that night. But the truth be told, anyone working at INL during that time frame should be part of a special exposure cohort because of the weeks and months of airborne releases continued leaking from SL-1, the contaminated roadways, and the other high routine and episodic releases in 1961. The cleanup personnel were monitored but inaccurately as needed to keep from admitting any excessive exposures.

As evidence that the AEC's environmental monitoring was not as great as it has been cracked up to be, the SL-1 building adjoining the D&Ded SL-1 reactor room were occupied until the late 1980s where CERCLA monitoring found the entire area around SL-1 highly contaminated and the buildings had to be D&Ded. Cesium-137 in the soil at SL-1 would be found extensively contaminated, supposedly from the cleanup activities. Cesium-137 soil samples ranged from 29 to 1854 pCi/g. Additional problems like those at Test Area North would be found extensively contaminated as well by 1990s CERCLA studies. This is after truckloads of contaminated soil were trucked from TAN in the 1960s supposedly addressing soil contamination issues. This basically puts anyone working at INL prior to the mid 1990s in need of a special exposure cohort. Then the cleanup of contaminated soil via excavation begins, yet the environmental monitoring folks never admit that soil excavation may explain many of the unexplained significant peaks in airborne radionuclide contamination.

Take a look at the total airborne releases during the 1950s and the allowable radiation limits, anyone in the vicinity of Test Area North during the IET tests and others should be in a special exposure cohort. Again, the

fiction that the monitoring was rigorous does not jive with the huge levels of radionuclide contamination they spread around and worked in for decades despite aerial surveys and various environmental monitoring programs – until CERLCA investigations began to find the extent of the soil contamination.

NIOSH has been very slow to realize the problems in adequately reconstructing radiation doses at the INL and denied far too many radiation illness claims. I know the INL is complicated, but NIOSH: You need to recognize when radiation doses relying on accurate radiation dose monitoring and records are simply not possible to obtain for many INL workers at many facilities. Some of the misinformation NIOSH has relied on about INL is simply propaganda perpetuated by the Department of Energy and those under its influence.

Key References:

Atomic Energy Commission report, Idaho Field Office, IDO-19302, "Report on the Nuclear Incident at the SL-1 Reactor on January 3, 1961 at the National Reactor Testing Station, January 1962.

<http://www.id.doe.gov/foia/PDF/IDO-19302.pdf>

William McKeown, *Idaho Falls: The Untold Story of America's First Nuclear Accident*. Toronto: ECW Press, 2003. See p. 90 – 95 for a description of the early stair ascents to the SL-1 reactor main floor.

Department of Energy DOE-ID Public Reading Room, "The Health Physics Aspects of the SL-1 Accident," by John R. Horan and William P. Gammill, USAEC Idaho Operations Office, Presented at the Health Physics Society Meeting at Las Vegas, Nevada, June 16, 1961. On page 4, Figure 2 "Radiation Levels in the SL-1 Area January 3, 1961" 500 r/hr is shown at the reactor building and 25 to 200 r/hr at the stairway. The control room is 10 r/hr. Figure 4 lists "SL-1 Exposures Greater Than 5 r" and it lists 14 people by job title. There are no firemen listed as receiving greater than 5 rem. The narrative describes firemen responding but does not mention all of the stair ascents by various people, including multiple ascents by the same people.

See ar.inel.gov for CERLCA cleanup documents pertaining to INL and various sources for environmental monitoring reports that never seem to be able to identify the source of elevated airborne contamination despite statistical analysis showing it likely came from the INL.

Sincerely,

Tami Thatcher

